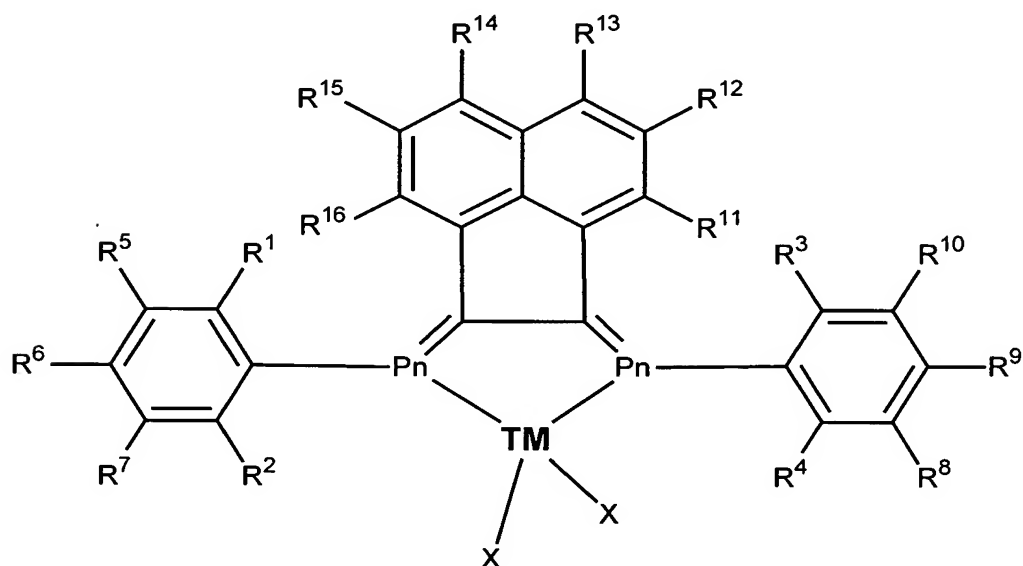


**CLAIMS**

What is claimed is:

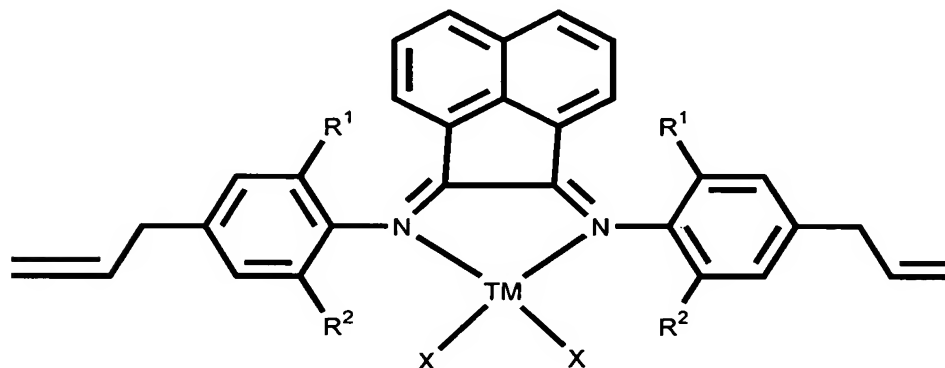
1. A composition comprising the product of combining, in the presence of a free radical initiator, at least one catalyst polymerization monomer, and a catalyst precursor compound wherein the catalyst precursor compound is represented by the formula:



wherein

- (a)  $R^1$ - $R^{16}$  are hydrogen or hydrocarbyl radicals provided that at least one  $R^5$ - $R^{10}$  or  $R^{11}$ - $R^{16}$  functions to make the catalyst precursor compound polymerizable by a free-radical-initiated polymerization reaction;
- (b) TM is a Group-4-11 transition metal, except Ni;
- (c) X represents an abstractable ligand; and
- (d) Pn represents a Group-15 element.

2. The composition of Claim 1 wherein the catalyst precursor compound wherein the catalyst precursor compound is represented by the formula:

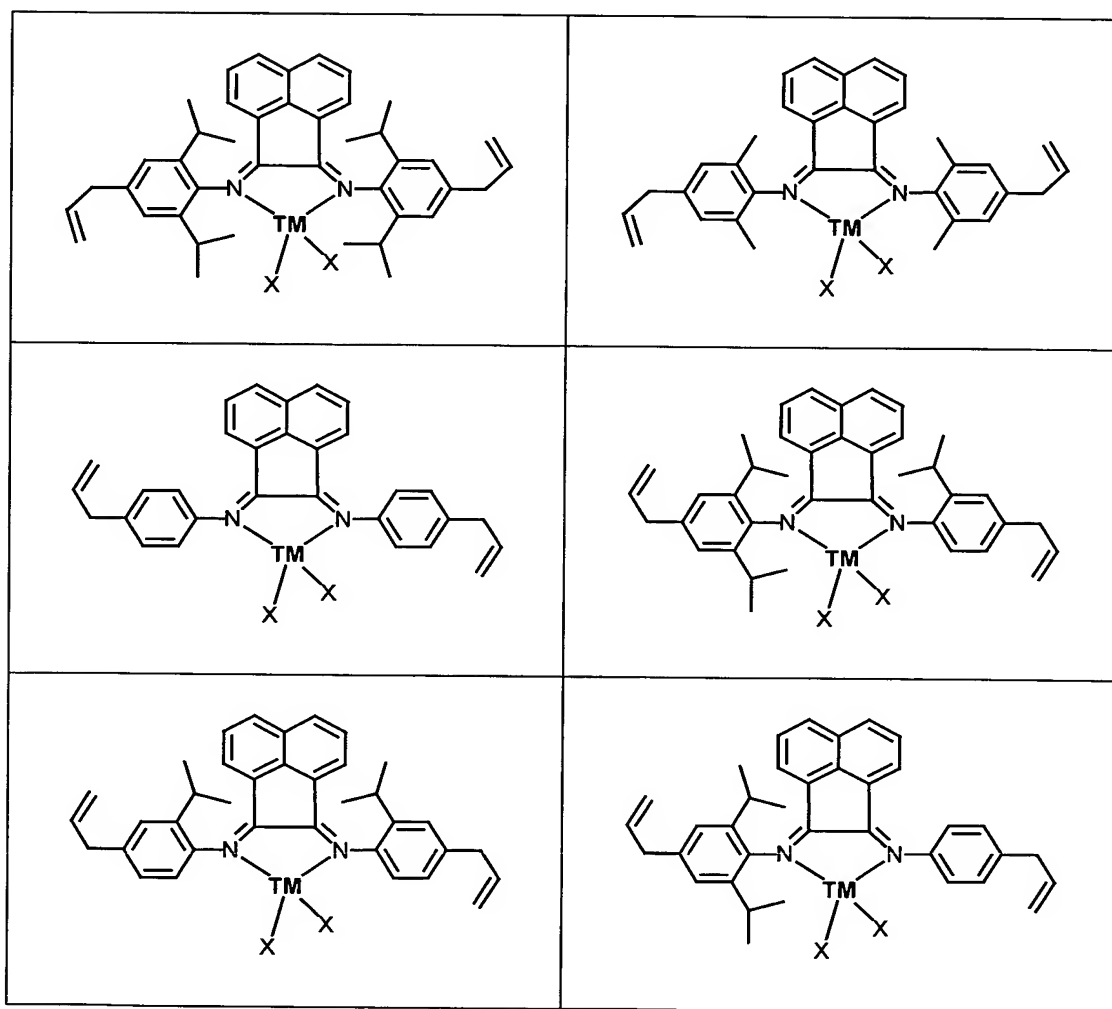


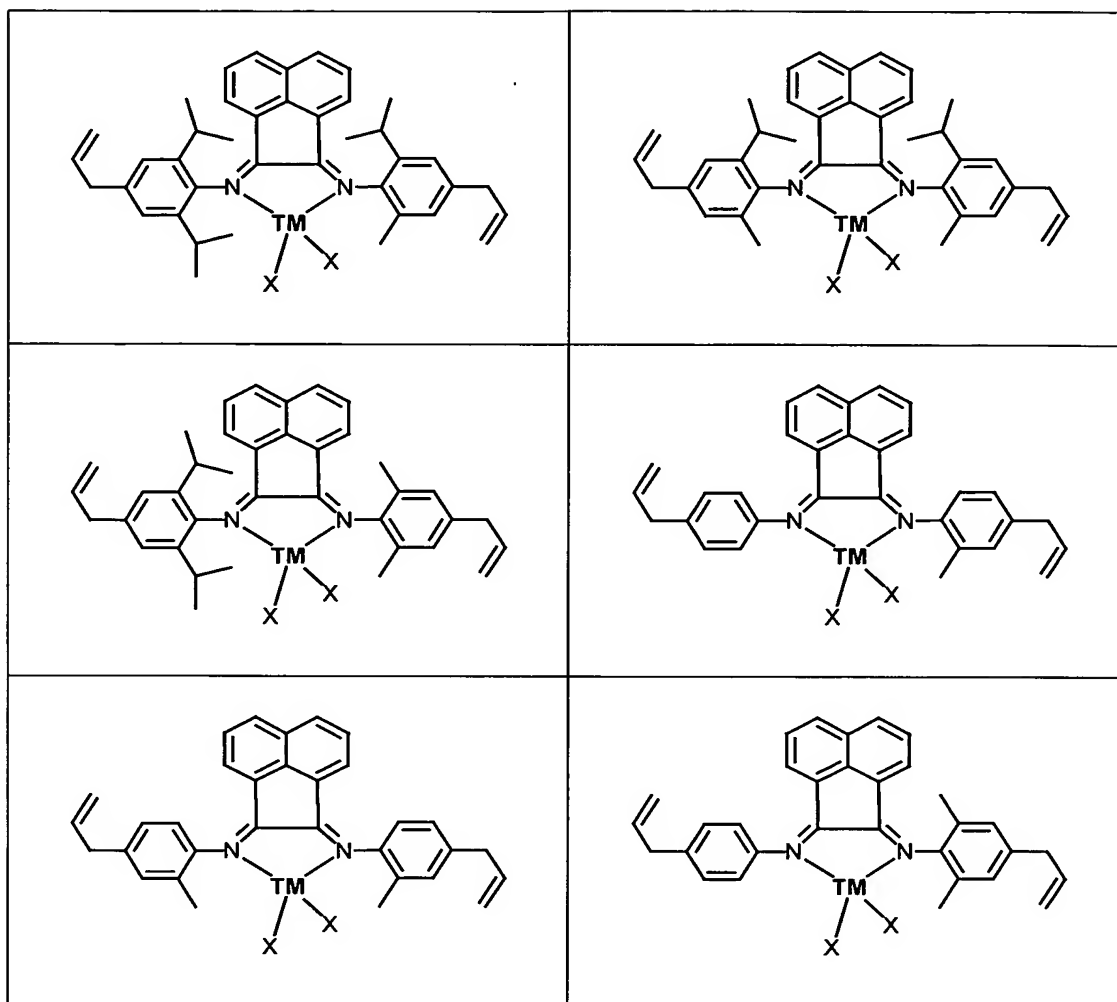
wherein

- 5 (a) each X is independently selected from abstractable ligands;
  - (b)  $R^1$  and  $R^2$  are independently hydrogen or hydrocarbyl groups;
  - and
  - (c) TM is a Group-4-11 metal.
3. The composition of Claim 2 wherein each  $R^1$  and  $R^2$  are independently  
10 selected from hydrogen or a C1-C50 hydrocarbyl group.
4. The composition of Claim 3 wherein each  $R^1$  and  $R^2$  are independently selected from hydrogen or a C1-C30 hydrocarbyl group.
5. The composition of Claim 4 wherein each  $R^1$  and  $R^2$  are independently selected from hydrogen or a C1-C10 hydrocarbyl group.
- 15 6. The composition of Claim 1 wherein TM is selected from a Group-9-11 transition metal.
7. The composition of Claim 6 wherein TM is Co.

8. The composition of Claim 1 wherein the abstractable ligands are hydride radicals; hydrocarbyl radicals; hydrocarbyl-substituted, organometalloid radicals.
9. The composition of Claim 8 wherein two abstractable ligands join to form a  
5 3-to-40-atom metallacycle ring.
10. The composition of Claim 8 wherein abstractable ligands are halogen, alkoxide, aryloxide, amide, or phosphide radicals.
11. The composition of Claim 10 wherein abstractable ligands are  
independently chloride, bromide, iodide, methyl, ethyl, propyl, butyl, pentyl,  
10 hexyl, heptyl, octyl, nonyl, decyl, undecyl, dodecyl, tridecyl, tetradecyl, pentadecyl, hexadecyl, heptadecyl, octadecyl, nonadecyl, eicosyl, heneicosyl, docosyl, tricosyl, tetracosyl, pentacosyl, hexacosyl, heptacosyl, octacosyl, nonacosyl, triacontyl, hydride, phenyl, benzyl, phenethyl, tolyl, methoxy, ethoxy, propoxy, butoxy, dimethylamino, diethylamino,  
15 methylethylamino, phenoxy, benzoxy, allyl, 1,1-dimethyl allyl, 2-carboxymethyl allyl, acetylacetonate, 1,1,1,5,5,5-hexa-fluoroacetylacetonate, 1,1,1-trifluoro-acetylacetonate, or 1,1,1-trifluoro-5,5-dimethylacetylacetonate radicals.
12. The composition of Claim 11 wherein at least one abstractable ligand is  
20 chloride or bromide.
13. A composition comprising the reaction product of the composition of Claim 1 and an activator.
14. The composition of Claim 13 wherein the activator is selected from  
alumoxanes, aluminum alkyls, alkyl aluminum halides, alkylaluminum  
25 alkoxides, discrete ionic activators, and Lewis acid activators.

15. The composition of Claim 14 wherein the activator is selected from methylalumoxane, modified methylalumoxane, ethylalumoxane, trimethyl aluminum, triethyl aluminum, triisopropyl aluminum, diethyl aluminum chloride, alkylaluminum alkoxides, ammonium borate salts, phosphonium borate salts, triphenyl carbenium borate salts, ammonium aluminate salts, phosphonium aluminate salts, triphenyl carbenium aluminate salts, trisarylborane acids, and polyhalogenated heteroborane anions.
- 5
16. The composition of Claim 1 wherein the catalyst precursor is represented by the formulae:





wherein

(a) each X is independently selected from abstractable ligands;

and

(b) TM is a Group-4-11 metal, except Ni.

5 17. The composition of Claim 16 wherein TM is selected from a Group-9-11 transition metal, except Ni.

18. The composition of Claim 17 wherein TM is Co.

19. An olefin polymerization method comprising the step of contacting an olefin and the composition of Claim 1.